I claim:

1. A ground fault circuit comprising:

(a) a power supply, and a transformer having a primary winding driven by the power supply and a high voltage secondary winding,

(b) a shutdown control circuit having a controllable switch and a control input coupled to the controllable switch for causing operation of the controllable switch when a trigger voltage applied to the control input is exceeded, the shutdown control circuit being coupled to the power supply for controlling shut-down of the power supply when the switch is in operation,

(c) a circuit connected to the high voltage secondary winding for detecting leakage current from the transformer to ground, for short circuiting an A.C. component of the leakage current passing through the detector to ground, and for deriving a D.C. voltage from D.C. leakage current from the transformer to ground, and

(d) a circuit for applying the derived D.C. voltage to the control input of the shutdown control circuit,

whereby the power supply may be shut down in the presence of leakage current in excess of the trigger voltage which is derived exclusively from D.C. current leakage from the transformer to ground.

2. A circuit as defined in claim 1 in which the secondary winding is center-tapped, and in which the detecting circuit is connected between the center tap and ground.

3. A circuit as defined in claim 2 in which the detecting circuit and the short circuiting circuit are comprised of a capacitor connected in parallel with a resistor having one junction connected to ground and

another junction coupled to the center tap, the capacitor and resistor being coupled to the control input of the control circuit.

4. A circuit as defined in claim 3 including a circuit for deriving a bias D.C. voltage from the secondary winding and for applying the bias D.C. voltage across the controllable switch.

5. A circuit as defined in claim 4 in which the circuit for deriving a bias D.C. voltage from the secondary winding is comprised of a rectifier circuit connected across a fraction of the secondary winding, the detecting circuit and short circuiting circuit being connected to the rectifier circuit.

6. A circuit as defined in claim 5 in which the circuit for deriving a D.C. voltage is connected between a center tap of the secondary winding and balanced spaced taps of the secondary winding on either side of the center tap.

7. A circuit as defined in claim 2 in which the detecting circuit is comprised of a rectifier circuit connected to an off-center tap of the secondary winding, and a first capacitor in series with a first resistor connected between the rectifier circuit and the center tap of the secondary winding.

8. A circuit as defined in claim 7 in which the rectifier circuit is comprised of a full wave rectifier comprised of a pair of diodes having cathodes connected to respective off-center taps located at balanced locations of the secondary winding, the anodes of the diodes being connected together to a negative terminal

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of the first capacitor, the positive terminal of the first capacitor being connected to a terminal of the first resistor, the detecting circuit further comprising a second capacitor having a negative terminal connected to the junction of the first capacitor and the anodes of the diodes, and having a positive terminal connected to ground, and a second resistor connected in parallel with the second capacitor, the second capacitor and second resistor being coupled to the control input of the switch.

9. A circuit as defined in claim 8 in which the first capacitor is coupled to the switch for applying a D.C. voltage appearing across the first capacitor, across the switch.

10. A circuit as defined in claim 9 in which the switch is comprised of a switchable solid state device having said control input, connected in series with a light emitting diode of an optocoupler, a light sensitive device of the optocoupler being coupled to a shutdown control input of the power supply, D.C. voltage appearing across the first capacitor being applied through current limiting means across the series combination of the switchable solid state device and light emitting diode of the optocoupler.

11. A circuit as defined in claim 10 in which the switch is a programmable shunt regulator having its anode connected to the junction of the anodes of the pair of diodes and the negative terminal of the first capacitor, and further including a third resistor connected between the control input of the shunt regulator and ground.

12. A method of shutting down a power supply which drives a transformer having a center-tapped high voltage secondary winding, comprising short circuiting A.C. leakage current that may flow between the secondary winding and ground, detecting D.C. voltage caused by D.C. leakage current which may be conducted between the D.C. biased secondary winding and ground, applying the D.C. voltage to the control input of a switch, and controlling shut-down of the power supply by means of the switch.

13. A method as defined in claim 12 including tapping a fraction of A.C. voltage appearing across the high voltage secondary winding, rectifying the fraction of the A.C. voltage to derive a D.C. bias voltage, applying the D.C. bias voltage to the transformer, and applying the D.C. bias voltage across the switch for operation thereof.

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